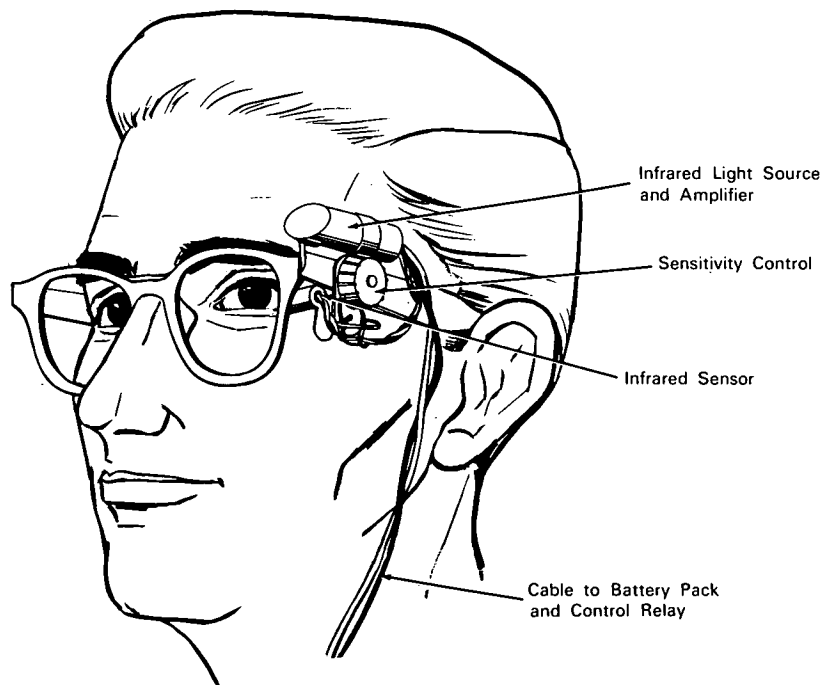


NASA TECH BRIEF



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Photoelectric Sensor Output Controlled By Eyeball Movements



The problem: NASA research in the areas of bio-science and biotechnology has included a number of studies to devise methods of utilizing certain voluntary physiological functions (extracted output) for communicating or for controlling external operations. One of these studies has been directed to devising a means of extracting useful signals from the self-controlled movements of the human eye.

The solution: A small device combining an infrared (IR) source and sensor that can be attached to eyeglass frames or a headband. Operation of the device depends on the difference in IR absorption between the

iris, which is a relatively good absorber, and the surrounding area of the eyeball, which reflects a relatively high percentage of the incident IR energy.

How it's done: The device incorporates an IR source, consisting of a battery-powered 6-volt or 10-volt lamp and high pass infrared filter (to filter out visible light from the lamp), and a cadmium selenide IR sensor. A filter is also placed in front of the IR sensor to exclude all ambient visible light. The IR source and sensor are mounted relative to one another so that when the eye is looking straight ahead all of the IR radiation from the source is incident on the

(continued overleaf)

area of the eyeball lying on one side of the iris and the radiation on this area is reflected to the sensor. This is the normal or off condition of the device. When the iris is voluntarily turned toward the IR source, a high percentage of the radiation is absorbed by the iris, and the external control relay connected to the sensor is actuated. An amplifier is used to amplify the current generated by the IR sensor. A sensitivity control connected to the amplifier permits adjustment of the threshold value for proper switching action under different ambient lighting conditions.

Note:

1. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama, 35812
Reference: B65-10079

Patent status: NASA encourages the immediate commercial use of this invention. Inquiries about obtaining rights for its commercial use may be made to NASA, Code AGP, Washington, D.C., 20546.

Source: Spaco, Inc., under contract to
Marshall Space Flight Center
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